DEPARTMENT OF AGRICULTURE, BENGAL.

ANNUAL REPORT

OF

AGRICULTURAL STATIONS IN CHARGE OF THE DEPUTY DIRECTOR OF AGRICULTURE, BENGAL,

FOR THE

YEAR 1909-10.

CALCUTTA:
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REPORT FOR 1909-10 OF AGRICULTURAL STATIONS IN CHARGE OF THE DEPUTY DIRECTOR OF AGRICULTURE, BENGAL.

Introduction.

During the year under report I was in charge of the following Agricultural stations:—Chinsura, Burdwan, Bankipore, Dumraon, Cuttack, Chaibassa and Kalimpong.

As a result of the year's work no further conclusions can be added to those already obtained in previous years, but former results have been further corroborated. The special feature during the year has been the efforts we have made to produce practical farm superintendents. In the past all our efforts were concentrated on experimental work in order that the department might have definite data on which to base recommendations to the cultivator. This of a necessity meant small areas. Now that we have larger areas to deal with and more responsibilities the general management has to be improved, and we find that Superintendents have a great deal to learn in this respect. Accordingly during the next few years our efforts will be largely concentrated on training practical farm superintendents and overseers. This is a most important work for progress is prevented for want of reliable practical men.

Chinsura—Which comprises an area of 210 acres, is still being laid out. Buildings have been erected and all experimental work for the Burdwan Division will be carried out at this station.

Burdwan—Has now reached the stage when it should be made into a centre for disseminating knowledge and seed. For this purpose the farm should be supplied with commodious *pucca* buildings, while the area should be fenced and a well educated man should be placed in charge of the work. It is proposed to carry out only demonstration work in future on this farm.

Bankipore—Is gradually being brought under control and may be expected shortly to be in full working order.

Dumraon.—A large godown is being built and the work of seed supply may be expected to be more thorough from now onwards.

Cuttack.—The increased area that was acquired last year is gradually being laid out and the good work of previous years is being continued.

Chaibassa.—The disease of the tasar caterpillars again showed itself and efforts are being made to find remedies for the pest.

Kalimpong.—The farm has now been laid out and good results are being obtained.

Fraserganj.—The work has been stopped for the present. The problem of the Sunderbans is an economical one. When the land is properly and sufficiently drained, all crops will grow.

Sufficient land has now been acquired by the Department for growing crops and several years must of a necessity pass before it will be wise to start any new farms in the province. In this respect it would be well for Agricultural Associations to note that practical training can be obtained free at the farms and that before members are ever likely to have any chance of success in their efforts at improvement they must have the necessary materials to show them the way. At present this material is practically non-existent.

As the Agricultural Department must always depend on enlightened members of Agricultural Associations and 'zamindars to bring improvements and results to the notice of the Bengal raiyat, and as much ignorance is shown all over the province by members of Associations of what the Agricultural Department is doing, instead of a detailed report of each farm, as in the past, I give this year a concise account of the recommendations we are able to make with reference to where these results have been obtained so that each member may have a basis on which to work. I trust each Association will take this as a standard, and if they can only get definite figures for a series of years to prove the same results, they will justify their existence as useful public bodies. For want of not knowing what they were doing, I fear interest has flagged in many of the Associations, but in spite of that work at the farms has continued with undiminished interest. Experimental work is very slow work and the exigencies of the Bengal climate make it even more slow than it would ordinarily be. Accordingly it becomes much more important to watch crops over a series of years before coming to any definite conclusions.

The following table gives full information of the situation, elevation, tract represented, acreage, type of soil, date of establishment, rainfall and the average temperatures of all stations that have been under my control. From this statement a fair idea can be obtained of the diversity of climate and conditions prevailing in different parts of the province. What is suited to one district is quite impossible for another and *vice versâ*. Accordingly where anything is recommended

each member should examine it under the light of local conditions and act accordingly.

Bengal Agricultural Stations.

Serial number.	Name of Stations.	Situation.		Tract represented.	Area in acres.	Type of soil.	Date when established.	Height above sea level.	Average rainfall in inches.	Temperature.	
		North latitude.	East longitude.							Maximum.	Minimum.
1	Sabour ...	25° 12′	87° 1′	Bhagalpore	324	Sandy loam	1906	160′	49·35	87°	68°
2	Burdwan ...	20° 70′	88° 00′	Burdwan ..	31	Sandy alluvium.	1885	99′	57·54	89°	70°
3	Dumraon (Shahabad.)	25° 30′	84° 00′	Shahabad	30	Sandy loam	1895	239′	41·13	88°	68°
4	Bankipore...	25° 37′	84° 14′	Patna ...	210	Heavy clay	1906	183′	44·54	88°	69°
5	Cuttack ...	20° 29′	85° 54′	Orissa Delta	120	Sandy ...	1904	80′	60·35	91°	73°
6	Chinsura ...	22° 53′	88° 27′	Lower Bengal Delta.	210	Clay ...	1908	38′	58·03	90°	79°
7	Kalimpong	27° 1′	88° 3′	Himalayan tract.	60¾	Loam ...	1907	3500′	89·52	85°	67°5
8	Siripur ...	26°	84°	Saran ...	33	Fine marl	1898	...	46·10	...	...
9	Fraserganj	22° 1′	88°	Sunderbans	75	Fine clay ...	1907	10′ observatory closed.			
10	Purnea jute seed farm.	25° 46′	87° 30′	Alluvium ...	30	Sandy loam	1906	123′	64·36	85°	70°
11	Berhampore jute seed farm.	24° 5′	88° 10′	Ditto ...	30	Loam ...	1906	67′	55·23	88°	70°
12	Krishnagar jute seed farm.	23° 23′	88° 32′	Presidency Division.	30	Sandy loam	1906	60′	55·16	87·8	68·7
13	Chinsura jute seed farm.	22° 53′	88° 27′	Lower Bengal Delta.	30	Clay ...	1906	38′	58·03	90′	79′
14	Chaibasa Tasar farm.	22° 33′	85° 51′	Transition or sub-metamorphic rock area.	50	Gravelly ...	1906	733′	53·80	90′	70′

Sabour is now in charge of the Principal of the Bengal Agricultural College and Siripur no longer carries out experimental work, while Fraserganj and the Jute seed farms of Purnea, Berhampore, Krishnagar and Chinsura have been discontinued.

It may interest readers to know that the Bengal Agricultural Department also carries out indigo research work in collaboration with the Bihar Planters' Association at Sirsiah (Muzaffarpur) under Mr. Bergtheil and investigation under Mr. Vanderkerkhove into flax as a fibre plant at Mr. L. Macdonald's factory at Dooriah (Bihar).

The following recommendations on agricultural crops have been established by experiment over a series of years at the agricultural stations noted in brackets after each. On going through a mass of correspondence from interested people all over the province, I find that many of the items have given as much satisfaction out in the districts as

they did in the experimental stations. It now remains for Secretaries of Agricultural Associations to prove whether they are satisfactory for each district, and to do this steps should be taken to carry out the demonstrations continually for a few years and each demonstration should be placed under the control of the Divisional Inspector who should keep a continuous record of the work:—

(1) Jute in rotation with paddy in the same year on the same land—

Jute 4½ seers seed per acre.

Manure 100 maunds cowdung.

Paddy to be transplanted by first week of August.

Manure paddy with 1½ maunds saltpetre at the end of September (Burdwan and Cuttack).

(2) Jute in rotation with potatoes on same land in the same year—

Only manure the potatoes with either 20 maunds castor-cake per acre, or 200 maunds cowdung, plus 3 maunds super and 2 maunds saltpetre. No manure necessary for the jute (Burdwan and Cuttack).

(3) Jute in rotation with *kalai* in the same year.

Only manure jute 100 maunds cowdung, (Cuttack).

(4) Jute—(*a*) *Deswal, Barapat* and *Hewti* varieties.

(*b*) Manures—(1) 100 maunds cowdung.

(2) 7 maunds castor-cake (Burdwan and Cuttack).

(5) Paddy—(*a*) Manure—(1) 50 maunds cowdung.

(2) Green manure with *dhaincha*, seed rate *dhaincha* 6 seers per acre. (Burdwan, Cuttack and Dumraon).

(*b*) Varieties according to selection of fineness and individual requirements. (All farms.)

(*c*) Central Provinces *aus* (Cuttack).

(*d*) Transplanting of one seedling 9″ apart. (All farms.)

(6) Sugarcane—(*a*) *Khari* variety—

Ikri variety for excessive water-logging.

(*b*) Manure 200 maunds cowdung, plus 8 maunds castor-cake per acre.

(*c*) Ridge and furrow system of planting (Dumraon).

(7) Wheat—Muzaffarnagar white wheat (club No. 1), Red *deshi* Cawnpore stands rust better than Muzaffarnagar, which rusts badly in moist localities (Dumraon).

(8) Oats (Dumraon) (Dumraon).

(9) *Juar* Saran (Siripur).

(10) Maize Jaunpur (Siripur).

(11) Gram Patna (Bankipore).

(12) Mustard Jabbalpur and Raipur varieties (Dumraon).

(13) Potatoes—(*a*) Patna variety of Nainital.

(*b*) Manures—(1) 20 maunds castor-cake per acre.
(2) 200 „ cowdung „
3 „ super „
2 „ saltpetre
(Burdwan and Cuttack).

(14) *Arhar* Saran (Dumraon).

(15) Meston plough (Cuttack).

For full details of experiments, annual reports for agricultural stations in 1908-09 and leaflets should be consulted. These publications can be obtained gratis on application from the Director of Agriculture, Bengal, Writers' Buildings, Calcutta.

CUTTACK.

During the past year the farm area was increased from 70 to 120 acres. This increased area is now in process of being brought under control. Roads and channels have been constructed and the necessary laying out operations are now being carried out. It is hoped that the dislocation of our work due to these extensions will be remedied in 1911 when work will be continued on the enlarged area.

The experimental programme of the previous year was continued, but instead of wearying the reader with a book of statistical tables this year, these tables are left out as far as possible and only the most important items of work are noted. Those desirous of more detail will find what is required in the report for 1908-09.

For situation, brief history, area, irrigation and character of soil of this situation see last year's report.

Weather.—The following table gives information of the rainfall recorded :—

Year and month.	Normal rainfall of Cuttack Sadar.	Actual rainfall at the farm.	Actual number of rainy days at the farm.
1909.			
April	1·38″	3·96″	11
May	3·54″	3·26″	8
June	10·91″	8·52″	22
July	12·06″	22·80″	25
August	12·43″	12·15″	17
September	10·48″	11·03″	17
October	5·75″	0·79″	2
November	1·36″	Nil	Nil.
December	0·35″	2·40″	5
1910.			
January	0·33″	1·26″	2
February	0·50″	Nil.	Nil.
March	1·31″	Nil.	Nil.
	60·40″	66·17″	...

Rainfall recorded was above the average but was not well distributed. The season was unfavourable for jute and paddy due to the very wet July and to the dry October and November. Accordingly the season was not favourable for any crop.

Experiments were carried out on jute, *aman* paddy, *aus* paddy, sugarcane, groundnut and the following data are worth recording :—

Jute.—So far as the crop is concerned on this farm, heavy manuring is essential if a crop worth harvesting is to be obtained and it becomes

a question whether the cultivator can afford such an outlay. The following few figures bear out this view :—

		Mds.	Outturn of fibre per acre in maunds (80 lbs.) 1907.	1908.	1909.
1.	Cowdung	100			
	Superphosphate	4	20¼	21¼	18¾
	Kainite	3			
	Sulphate of ammonia	2			
2.	Cowdung	100			
	Superphosphate	4	19¼	18½	18⅛
	Sulphate of ammonia	2			
3.	Cowdung	100			
	Superphosphate	4	16¼	15¼	17⅛
	Saltpetre (Indian)	2			
4.	Cowdung	100	12½	9¾	12½
5.	Unmanured		10½	4	10¼
6.	Cowdung	100	18½	14¼	18½
	Sulphate of ammonia	2			
7.	Cowdung	100	...	5¼	13⅛
	Superphosphate	4			
8.	Castorcake	5	12½	10¼	14½
9.	Cowdung	100			
	Superphosphate	4			
	Kainite	3	21¼	22	19⅞
	Sulphate of ammonia	2			
	Sulphate of magnesia	2			

The same conclusion is brought out by the following data :—

Crop.	Manure.	Planted.	Harvested.	Yield per acre in maunds. Grain.	Fibre or straw.
	1906. Mds.				
Jute	Cowdung 400	10th April	21st August ...	...	17¾
Paddy	Unmanured ...	26th August	5th December	18⅝	33⅛
Jute	Cowdung 400	10th April	21st August ...	...	15
Paddy	Unmanured ...	26th August	6th December	17⅜	35⅓

Crop.	Manure.	Planted.	Harvested.	Yield per acre in maunds.	
				Grain.	Fibre or Straw.
	1907.				
Jute	Cowdung 100	15th April	1st August ...	...	15
Paddy	Saltpetre 1	7th August	10th December	32	50
	1908.				
		(5 plots, $\frac{1}{5}$th acres each.)			
Jute	Cowdung 200	5th April	8th August ...	...	16½
	Super 3	...	.....	...	...
	Sulphate of ammonia. ½	...	.....	20	...
Paddy	Unmanured ...	...	9th August ...	...	40
			(attacked by insects.)		
	1909.				
Jute	Cowdung 200	21st April	1st August ...	...	19¼
	Super 3	...	.....	...	...
	Sulphate of ammonia. 1½	...	.....	...	...
Paddy	Saltpetre 1½	6th August	23rd December	37½	56¼

These figures only bring out how poor is the Cuttack farm soil. One can only repeat that manuring is a local problem and in the districts where jute is grown much smaller applications of manure may give excellent results. The above manures may serve as a guide to any member of an association who is desirous of carrying out such work.

The quality of the jute grown on this farm is equal to good Narainganj. I sent 100 maunds to the Hastings Jute Mill for valuation from the Spinner's point of view and Archie Birkmyre, Esq., Managing Director, gave the following report :—"100 maunds jute, Cuttack farm, was examined on 7th March 1910. The fibre is quite good, and but for lack of a little lustre and body would be equal to the best of

fibre produced in Narainganj." On that date the best marks were fetching Rs. 7-8 per maund and he valued the Cuttack jute at Rs. 6-12.

Aman paddy.—Manure. So far as manure for this crop is concerned, we have not yet learned what artificial manures to apply and how much to apply per acre and when we do the time to apply. These same manures will be a problem to be solved by every individual farmer. It is not surprising that no results are obtained from soluble artificial manures when immediately after application a heavy shower of rain falls that washes everything into neighbouring fields. This will explain the great care that is necessary when experimenting or demonstrating with artificial manures and why phenomenal results have been obtained with saltpetre in some cases, while in others no perceptible difference was noted in the outturn.

The following outturns obtained in 1909, which corroborate previous results, emphasise the above and show why we cannot recommend anything for the *aman* paddy crop, but 50 maunds of cowdung per acre or green manuring with *dhaincha*:—

No.	Manures.	Maunds.	Yield in 1909 in maunds.	
			Grains.	Straw.
1	Farm cowdung	50	22½	51½
2	Village refuse	50	23¼	60
3	Unmanured	...	20¼	50¾
4	Cowdung	100	23½	45
5	Cowdung	100	23¾	43¾
	Superphosphate	3		
6	Cowdung	100	25	45
	Saltpetre	1		
7	Cowdung	100	26¾	63¾
	Superphosphate	3		
	Saltpetre	1		
8	Bonemeal	3	24½	50¾
	Saltpetre	1		
9	Unmanured	...	19	57½
10	Green manured *dhaincha* ...	...	26	61¼
11	Cowdung	100	27¼	56¼
	Superphosphate	3		
	Saltpetre	1		
	Sulphate of Magnesia ...	1		

Varieties.—With regard to varieties of *aman* paddy, in a country where nearly every man, woman and child in every village can distinguish the different varieties that they have in their village according to the different sites, conditions and elevations, it would be futile for any department to make recommendations. Suffice it to say, that we have seed of several good-yielding varieties of coarse grained, medium grained and fine-grained paddies that can be obtained at local rates on application, and as we guarantee purity and germinating power, the seed can be relied upon.

How to plant.—The outturn from the one seedling per hole is so much greater than 2, 4 or 8 seedlings per hole this year that, apart from the enormous saving of seed in the seed-bed, the larger crop obtained has to be considered.

The following results speak for themselves :—

Treatment.	Outturn per acre in maunds of 80 lbs. *Hatisal* variety in 1909.	
	Grain.	Straw.
	Mds.	Mds.
1 seedling per hole ...	28	50
2 seedlings do. ...	24¾	56¼
4 ditto do. ...	22¼	58¾
8 ditto do. ...	24½	60

What plough to use.—The continued success that is being obtained with the Meston plough makes me bring it further to the notice of the cultivator. A photo of this plough is enclosed with this report. Not only is it light to work, but it is cheap and spare shares can be replaced at a moment's notice. Messrs. Leslie & Co., Calcutta, have arranged to supply these ploughs with spare shares at the very cheap rate of Rs. 5 and 6 annas respectively, and where Associations join to purchase large numbers of 50, much better terms are obtainable. The following figures speak for themselves :—

	1906.		1907.		1908.		1909.	
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
	Mds.	Mds.	Mds.	Mds.	Mds	Mds.	Mds.	Mds.
Cuttack plough ...	16¼	33⅛	25	40¾	41	80½	32½	71¼
Burdwan do. ...	27¾	55⅝	26¼	40½	41½	83	34¼	66½
Sibpur do. ...	26¼	44⅝	22½	40	38¾	84¼	34½	72½
Meston do. ...	30¼	53¾	27¼	40½	45	83	37½	78¾
Hindustan do. ...	31¼	58⅜	27½	41¾	42	85	37	81¼

Broadcasting paddy.—In broadcasting *aman* paddy there is no necessity to use more than 30 seers of seed per acre. As this experiment has been carried eut five years, the full table of results is given below and the experiment will be discontinued henceforth :—

	Outturn per acre in maunds of 80 lbs.									
	1905.		1906.		1907.		1908.		1909.	
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
	Mds.	Mds.	Mds.	Mds	Mds	Mds.	Mds.	Mds.	Mds.	Mds.
40 seers per acre ...	26 7/8	40 1/4	13 1/8	16	22 1/2	42 1/2	38	88	29 1/4	56
35 ditto ...	28 3/4	40 5/8	18 3/4	30 3/4	21 1/4	34 1/4	42	87 1/4	29 1/2	51
30 ditto ...	28 7/8	40 3/8	16 1/4	26 3/4	22 1/2	41 1/4	43 1/2	84 1/2	32 1/2	52 1/2
25 ditto ...	25	33 3/8	15	21 7/8	20	39	45	77 3/4	30 1/4	52

Hydraulic experiments.—With regard to the use of water on the *aman* paddy crop without irrigation the crop is precarious. If the season is favourable, a crop may be obtained, otherwise the crop is doomed.

As to the quantity of water to apply there is so little difference between 3″ and 6″ in the outturns obtained that it would seem superfluous to use the extra 3″ of water.

Aus paddy.—The only remark on this crop worthy of note is that Central Provinces *aus* appears to be losing its vigour. New seed will be brought in from Sambalpur this year for comparison :—

	1909.			
	Transplanted.		Broadcasted.	
	Grain.	Straw.	Grain.	Straw.
	Mds.	Mds.	Mds.	Mds.
Central Provinces *aus*	19 1/2	46 1/2	17 3/4	48
Benibhog (local) ...	27	48 1/2	22 1/3	50 1/3
Kinshiu ...	18 3/4	34	11 1/2	41 1/2

The local variety gave easily the best return, while the worst was obtained from the Japanese variety of paddy kinshiu. This only

further corroborates our experience that if prolificness is to be maintained seed must be changed every few years.

Other crops.—There is nothing new to report on other crops. The *khari* and *mungo* varieties of sugarcane again proved themselves suited to Orissa, while groundnut and turmeric continued to give economical results on poor soils. Potatoes were so badly affected by disease as to be uneconomical.

Distribution of seeds.—During the year the farm had distributed the following for seed purposes :—

Name of seeds.	Mds.	s.
Central Provinces fine *aus* paddy ...	60	20
Benibhog	2	4
Kinshiu (Japan)	1	7
Banka	0	24
Dudkalma	0	24
Shukavel	1	9
Kalajira	4	0
Dadkhani	11	33
Banktulshi	1	9
Hatisal	2	12
Samudrabali	7	15
Badshabhog	15	23
Khiraijali (balam)	0	4
Chingarbhusi (do.)	2	7
Khasagundi	0	19
Khura	6	4
Benaphuli	2	9
Hunda	19	4
Jagannath Kantia	2	4
Kamode	0	2
Sitasal, kalamkati, gyabali, ramgada, jamailaru, jatakalam, ramsal, sitabalam and dayasal, two seers of each ...	0	18
Jute seeds	0	35
Groundnuts	17	26
Dhaincha seeds	6	10
Sugarcane (mungo)	2,950 canes	
Do. (khari)	600	„

Practical Training of Students.—The following have received practical training during the past year:—

2 Farm overseers.

4 Student cultivators.

Acknowledgments.—I take this opportunity to thank Archie Birkmyre, Esq., for the trouble he took in appraising the jute grown at the farm and C. Somers Taylor, Esq., Agricultural Chemist, for all analyses done during the year.

Management.—The station belongs entirely to Govenment and is managed by the Bengal Agricultural Department.

During the period under report, Babu Raj Nath Roy was the Superintendent in charge. He did good work. The Deputy Director made 13 inspections, while the Director of Agriculture also visited the station.

The Divisional Agricultural Association now hold their meetings at this farm.

A. Howard, Esq., Imperial Economic Botanist, visited this station on 23rd December 1909 and noted: "It is the most promising farm I have yet seen in India and it is a pleasant surprise to see how much has been done in such a short time."

BURDWAN.

Crops were grown during the past year, but there are no results to publish that have not already appeared in previous annual reports. These should be consulted for details.

The monetary returns of the year were adversely affected by a terrible flood which broke through the farm in the end of August and washed away the Superintendent's quarters.

This is now the most unsatisfactory farm controlled by our department. In the past this station did excellent experimental work on crops, and as definite results have been obtained in many respects, it becomes necessary to expand our energies and train young men before sending them out into the districts to bring these results to the notice of cultivators.

I tried to make a start on these lines last year, but did not get very far, as the farm funds at my disposal were quite inadequate. After due consideration I now see that without a large initial expenditure and a larger recurring one than at present sanctioned, it will be useless to continue work on these lines. The best thing that could happen to this pioneer experimental farm which has now been in existence 25 years would be to convert it into a centre where good practical training can be obtained by young men and into a central seed store for the Burdwan district.

For this certain things are requisite. Pucca and more commodious buildings are essential, the land requires fencing, larger steeping pits are required, a few roads must be built and a properly qualified man must be placed in charge of the work.

Management.—The expenses of this station are borne by the Maharajadhiraj of Burdwan who allots for the purpose Rs. 2,500 per annum plus receipts from farm produce sold. A little more money should now be allowed for supervision, so that a better educated man may be placed in charge of the work. Babu Debi Prasad Chaubey was Superintendent in charge of the work and he paid constant attention to his work. He is now old and has been 22 years in charge of this work and should be replaced by a younger and more energetic person.

CHINSURA.

This farm was only opened in 1908. Work was pushed on during the past year. We have now the requisite buildings, but no arrangement has yet been made for irrigation, so that it will be some time before we shall have the work under control. Results so far show that we have not yet obtained uniform conditions suitable for experimental work; still much useful work is being done already, as will be seen from the following table of seed distributed from the farm during the year: —

	Mds.	s.
Badshabhog paddy	19	39
Samudrabali „	12	24
Dadkhani „	24	21
Banktulshi „	7	19
Khiraijali „	0	15
Chingarbhusi „	1	10
Hatisal „	1	0
Nagra „	1	10
Bankui „	1	10
Central Provinces fine *aus* paddy ...	85	14
Local *aus* paddy	3	0
Dhaincha	18	7
Dhaleswar jute	2	28
Deswal „	4	26

Management.—The station belongs entirely to Government and is managed by the Bengal Agricultural Department. During the period under report, Babu Taranath Rai was the Superintendent in charge. He did good work. The Deputy Director of Agriculture made 14 inspections during the year and the Director of Agriculture also visited the station.

BANKIPORE.

Work was continued on this farm during the period under report. Results show that we are still dealing with ununiform conditions, which is not surprising, considering the large amount of laying out work that has been done. This work is not yet complete and we have still a great deal to do before we shall have the whole farm under our control. Sufficient facilities have not been made for irrigation, but it is hoped with four openings on the canal and the necessary channels to improve our requirements in this respect and this work will be pushed on during the next cold weather. This means we have still much to do before we can hope for results that will be worth publishing, still no one has been idle and the large amount of seed that we were able to distribute as the result of the past year's work shows that something useful has been accomplished. Excellent crops of paddy, sugarcane, *juar*, gram, wheat and peas have been grown on this farm and we may look forward to this farm being a good distributing centre for seed of these crops.

During the year the farm has distributed the following for seed purposes :—

	Mds.	s.
Baitarini paddy	229	31
Badshabhog „	2	12
Bansphul „	197	9
Banktulshi „	50	26
Central Provinces fine *aus* paddy ...	7	33
Ditto (Raskadam) ...	12	14
Dhusra paddy	48	0
Dhania „	13	20
Dadkhani „	10	2
Hatisal „	2	5
Kappursur „	3	30
Kanchanchur „	40	8
Khiraijali „	1	20
Kalamdan „	4	30
Kinshiu (Japan) „	0	5
Maharajwa „	4	33
Morua „	4	20
Ramsal „	12	28

	Mds.	s.
Ratwa paddy	11	12
Samudrabali ,, ...	25	1
Shapashand ,, ...	4	2
Samjira ,, ...	0	14
Jaunpur maize (cobs)	6	0
Do. grain	88	1
Onion (Patna)	0	3
Juar (Saran)	23	26
Oats	25	17
Pea	96	32
Sarsoo	6	0
Khesari	2	35
Wheat	14	38
Mustard	2	26
Gram	200	34
Lentil	32	16
Linseed	1	14
Mauritius cane cuttings ...	2	0
Khari ditto	10	0

Very shortly we shall have a good set of labourer's quarters when student cultivators may come to this farm to receive practical training in the same way as at the Cuttack station.

DUMRAON.

The good work of previous years done at this farm was continued during the year under report. Most of the good work however, was practically lost through having no godown in which to store seed. After much delay godown accommodation has at last been sanctioned and will be available for the crops of 1910. This will enable us to get practically in contact with the cultivator through a better seed supply.

Sugarcane and wheat are the two main crops under experiment at this station, but paddy and other crops receive attention. For area, situation, rent, irrigation, soil and details of experiments, see last year's annual report of this station. The year 1909 was a very unsatisfactory one so far as rainfall is considered. In June, the abnormal rainfall of 18·83″ was recorded instead of 3·82″, after which, July, August and September were below normal, while October, the critical month for paddy, was almost dry. Accordingly the cultivator had to depend on irrigation and where water was not available, the crops suffered.

The following table gives details : –

Month and year.	Normal rainfall in inches.	Actual rainfall in inches.	Actual number of rainy days.
1909.			
April	0·82	0·67	5
May	0·44	Nil.	Nil.
June	3·82	18·83	17*
July	10·29	9 90	18
August ...	11·03	8·12	18
September ...	8·17	7·98	12
October ...	2·03	0·75	2
November ...	Nil.	Nil.	Nil.
December ...	0·23	1·46	2
1910.			
January ...	1·05	0·18	2
February ...	·89	Nil.	Nil.
March ...	1·33	Nil.	Nil.
Total ...	40·15	47·89	

* Abnormal.

Experimental results.

Sugarcane.—Last year's annual report should be consulted for a detailed account of the experiments on this crop.

The following results were obtained in 1909-10 :—

Manure.—The table gives information on the manurial experiment on sugarcane and shows that sulphate of ammonia along with castor-cake or saltpetre along with castor-cake are very economical manures for this crop.

Khari Cane, 1909.

	Quantity per acre.	Outturn per acre.	Cost of manure.
	Mds.	Mds.	Rs.
1. Cowdung ... 200 + Castor-cake ... 8		46½	34
2. Unmanured		30	...
3. Castor-cake ... 8 + Saltpetre ... 4		53¾	40
4. Bonemeal ... 6 + Saltpetre ... 4		40⅓	31
5. Castor-cake ... ... 8 + Sulphate of ammonia 4		60½	41
6. Cowdung ... 100 + Rape-cake ... 8		45	28

Wheat.—We have nothing new worth recording. Mr. Howard at Pusa has done excellent work on this crop during the past few years, and we hope some of his varieties will be available shortly for this province. Mr. Howard's varieties are hard and rust resisting. The former quality is now being asked for by the trade, while the last quality is very important for Bengal.

Paddy.—The following results were obtained on this crop and corroborate the previous conclusions we came to on the prolificness of *maharajwa* and *bansphul* varieties and demonstrate the economy of 50 maunds of cowdung, green-manuring with *dhaincha* or cowdung plus castor-cake as manurial application for this crop.

The Nigar process proved the more economical in 1909:—

Name of variety.	Yield per acre. Grain.	Straw.
	Mds.	Mds.
Badshabhog	26¼	105
Dadkhani	17¼	90
Maharajwa	35¼	90
Sukhavel	17⅛	85
Bansphul	29¾	110
Srikole	24¼	100

Manure.—

	Outturn per acre in maunds. Grain.	Straw.
Cowdung 50 maunds ...	36¼	110
Ditto 100 „ ...	36¼	105
Ditto 34 „ + Castor-cake 3¾ „ ...	40½	120
Sunn hemp g. m. ...	31¾	110
Bonemeal 3 maunds + Saltpetre 1 maund ...	3-½	90
Unmanured	21¼	65
Dhaincha	34	125
Unmanured	20½	70

Nigar vs. *no Nigar.*

	Maharajwa. Grain.	Straw.	
Cowdung 100 maunds ...	32½	64	Nigar.
Ditto ...	25¾	54	No Nigar.
Nil	27¾	56	Nigar.
Nil	26	48	No Nigar.

Other crops corroborated what has already been said in previous years.

Conservation of cattle-dung.—Pits have been made for storing cattle-dung properly. Cowdung is collected along with the urine and stored, protected from sun and rain. This manure was compared with cowdung (dealt with according to the local custom) as a manure

for paddy. The following results show the superiority of the farm pitted cowdung over the raiyat's cowdung which is left exposed to the sun and rain from the time it is collected :—

Quantity of cowdong applied per acre.	Quantity per acre in Maunds.			
	1909.		1910.	
	Grain.	Straw.	Grain.	Straw.
1. Farm pitted cowdung, 100 maunds	26¼	47	36¼	105
2. Raiyat's cowdung, 100 maunds ...	15⅞	27½	29¾	100

Distribution of seeds, etc.—The following have been supplied by the Farm Superintendent during the year :—

Serial No.	Name of seed, etc.	Quantity supplied. Mds. s.
1.	Dumraon oats	345 33
2.	Canadian Welcome oats	3 0
3.	Muzaffarnagar white wheat	14 6
4.	Hybrid pissi wheat	4 11
5.	Hybrid bansi wheat	0 7
6.	Buxar white wheat	2 9
7.	Barley (local)	53 13
8.	Peas (local)	1 10
9.	Gram (local)	19 29
10.	Raipur mustard	9 12
11.	Jubbalpur mustard	0 1
12.	Lalka tori local mustard	0 38
13.	Local *rahar*	2 0
14.	Saran *rahar*	0 22
15.	Chaitalli *rahar*	1 0
16.	Maharajwa paddy	11 7
17.	*Dadkhani* paddy	2 30
18.	*Badshabhog* paddy	3 30
19.	Central Provinces *aus* fine paddy ...	4 12
20.	Central Provinces *aus* coarse paddy ...	0 21
21.	Shera paddy (local *aus*)	14 38
22.	Gadur paddy (local *aus*)	3 14
23.	Challi (Bankura early) paddy	2 8
24.	Tatko (Bankura early)	2 38
25.	*Khari* sugarcane	⅜ acre of standing canes.

Serial No.	Name of seed, etc.	Quantity supplied. Mds. s.
26.	Thick canes (red Mauritius, white Mauritius and paundia.)	110 whole canes.
27.	Masulipatam turmeric	7 10
28.	Sunn hemp	0 10
29.	Dumraon mot	two
30.	Pulley for working mot	one

Practical training of students.—During the year under report the boys of the Dumraon Raj High English School received practical instruction on the station.

Acknowledgment.—The department is indebted to Mr. C. Somers Taylor, Agricultural Chemist to the Government of Bengal, for all analyses made during the year and I take this opportunity of thanking him for all the help he has given me during the past year.

Management.—The expenses of the station are borne by the Dumraon Raj Estate, which is now under the Court of Wards, but the entire mangement is in the hands of the Department of Agriculture. Bengal. During the period under report Babu Kishori Mohan Ghose was the Superintendent in charge and he did very good work. The Deputy Director made 11 inspections and the Director paid three visits to the station.

CHAIBASSA.

The work of previous years was continued during the period under review. Disease again appeared in the worms, and it was decided not to distribute any more seed cocoons to cultivators till something definite was known of the disease. Mr. C. W. Hutchinson, Imperial Bacteriologist, now has the disease under observation, and it is hoped some remedy may be evolved to combat the evil. The most important successful item of work that is worthy of note is, the great success we obtained with the groundnut crop. This crop commonly known as *chinabadam* grew luxuriously on land that previously, in spite of every effort, refused to grow anything. An outturn of 28½ maunds per acre was obtained. This should be noted for the Kolhan, for there are many areas that are unproductive at present and which are unirrigable through being on high land.

The good work of distributing *buri* cotton seed was also continued during the year.

For details of work that is done at this station, last year's report should be consulted.

The following seed was distributed from this farm during the year:—

	Mds.
Buri cotton seed	13¾
Groundnut	20

Management.—The expenses of the station are borne by Government and the farm is managed by the Bengal Agricultural Department.

Mr. De Dombal continued in charge as Superintendent and worked with his customary energy. The Deputy Director of Agriculture, Bengal, made 10 inspections, and the Director also visited the farm.

KALIMPONG.

Introduction.—In conjunction with the St. Andrew's Colonial Homes at Kalimpong, a demonstration farm was opened at Kalimpong in April 1907 for the district of Darjeeling. Mr. Percy Goodwin is in charge of the station. The chief work at this farm has so far consisted in acquiring and fencing the land, laying out the area and erecting the necessary buildings. This work is now completed, and the agricultural practices of this part of the Himalayas in the Bengal district of Darjeeling will now be tested and definite figures of the cost of cultivation of the chief crops of this tract with outturns per acre will be worked out.

The geological formation of this station in the extra-peninsular area, which is not represented on any of our other agricultural stations in Bengal, is the Daling series of transition rocks. From analyses we find that in the hills we are dealing with soils totally different in composition from those of the plains of Bengal, where organic matter is very deficient in all cultivated areas.

The normal rainfall of the Kalimpong district is about 90 inches. Such heavy rainfall can only be supported by certain crops because of the rapidity with which the water drains off these slopes, and it is very remarkable that the maize crop thrives so well as it does, for it reaches a maximum that is seldom approached on the plains. Water-logging kills the maize plant, and one can only admire the provision of nature that facilitates the immediate drainage of the surplus water. On the other hand, for the paddy crop, which delights in plenty of water, each terraced is embanked by little bunds to cause accumulation. The winter months from November to March are very dry, and there is not sufficient natural moisture to ensure full crops. Accordingly potatoes and vegetables and *rabi* crops must be watered or irrigated if large crops are wanted.

A cropping scheme has already been drawn up for this farm.

Although we have not been at work very long at this station, we have already some interesting results to record. Jaunpur maize, which has given such excellent results on the plains, is quite unsuitable for the hills. This variety failed entirely in 1907 and 1908, when the local variety did exceptionally well.

The following interesting results were obtained in 1908-09 :—

A. Local maize—33 maunds 15 seers per acre. Grown on rice terraces, unmanured, and ·77 acres in area; stalks not given.

B. Buckwheat—12 maunds grain, 27 maunds straw per acre.

C. *Juar*—11 maunds 24 seers grain per acre straw not given.

D. Wheat—8¼ maunds per acre, straw 17 maunds.

E. Paddy—20½ maunds grain per acre, 32⅛ maunds straw.

F. The Horatius cornsheller, (Montgomery Ward), has given very satisfactory results. (T. E. Thompson & Co., Calcutta) Rs. 6.

Shells—4·5 maunds of grain per hour. Nine and-a-half maunds grain from 20 maunds of cobs (with leaves round cobs).

In 1909 an outturn of 37¼ maunds of maize per acre was obtained.

In addition to ordinary crops, a thorough test will be made with English fruit trees to find out their suitability for the Kalimpong hills, and seedlings of the most important trees have already been obtained from the Royal Nurseries, Maidstone, England. These will be properly treated and their progress year by year will be carefully recorded. The annual report should be consulted for details.

F. SMITH,

Deputy Director of Agriculture, Bengal.

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